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1956**

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3382.5 Kc.	7004 Kc.	7040 Kc.	7125 Kc.	8182.5 Kc.
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VK3WI: Sundays, 1000 hours EST, simultaneously on 3.5, 7, 14 and 144 Mc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

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EDITORIAL



DEMOCRACY AT ITS BEST

On the 22nd February, 1857, in London was born a man whose name was destined to become famous both in the military sphere and in every remote part of the globe where mankind lived and flourished. His name was Robert Stephenson Smyth Baden-Powell, better known perhaps under his several nicknames of Ste. (a contraction of his second Christian name, Stephenson, and used mostly by his family); dear old Bathing Towel to his school pals; He of the Big Hat to the Ashanti campaigners; the Wolf that Never Sleeps to his African enemies, the Matabele; and to the world at large as plain but familiar "B-P".

Lord Baden-Powell, as he afterwards became, was a man with outstanding courage, vision and tenacity of purpose. History records details of his Defence of Mafeking during the Boer War in 1899-1900 as one of the outstanding military achievements of all time, yet he was to go on to far greater achievement in completing one of the masterpieces of International organisation—the Boy Scout Movement—a Movement to which he initially gave his spare time and later in life all his time.

Today, despite bitter wars between Nations, the Boy Scout Movement has continued to flourish and expand, carrying on his great teaching—"To train our future men to be level headed, to give fair play to all, to be unselfish, manly and responsible beings". In those few simple words lies a challenge to youth which has been taken up and perpetuated through four generations and will no doubt continue unto eternity.

"Be prepared," he said, and these words became the Scout's Motto. "Train your Scouts as individuals and then harness that individuality for the good of the whole" was his great democratic aim, and to this end he gave his all until his passing on the 8th January, 1941.

In our modern scientific age signalling from the simplest form with lamps or flags to the more complex telegraphic and telephonic systems is one of the primary interests and pursuits of the Boy Scouts. In many countries various Boy Scout Branches have Amateur Radio Transmitting Stations as part of the Scout training in signals. This not only brings the Boy Scout Movement to the forefront in signalling facilities, but proves a worthwhile training ground for those who ultimately choose the radio and electronic field with its wide ramifications as their profession in life. This country will want more and more young people to become interested in the science of radio transmission and reception in its many forms as the population increases and the requirements for technical services in this sphere become greater and greater.

To this end the Wireless Institute of Australia has installed a complete Amateur transmitting and receiving station at the site of the Pan-Pacific Jamboree being held at Clifford Park, Victoria, from 28th December, 1955, to 9th January, 1956, where 10,000 Boy Scouts from the Commonwealth and overseas countries are encamped for one of the greatest Jamborees of all time—a tribute to the great founder of the Movement who lived to see it grow from its inauguration

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Pi Network Tank Circuit

BY K. M. SAXON,* VK7AI

UNTIL recently, the pi network has had little use in Amateur built transmitters, probably because of the difficulties associated with its use in triode amplifiers. But with the trend towards single ended tetrode amplifiers, due in no small measure to the advent of television with its associate t.v.i. of the harmonic variety, the pi network has much to offer from a harmonic reduction point of view, besides affording a simple method of band changing which makes a completely shielded enclosure a relatively simple matter, as access doors do not have to be provided for coil changing. Thus the operator runs no risk of self elimination if he forgets to turn off the high voltage when changing bands.

The main purpose of this article is to describe the writer's final amplifier which uses a pi network. But before doing so, a discussion of the theory of the pi network is desirable.

THEORY OF THE PI NETWORK

The pi network is by no means a new idea. Its main use has been in aerial coupling devices, with some use as a tank circuit in pre-war Amateur portable equipment, etc. It was used in at least one pre-war 5 kw. broadcast transmitter, where its harmonic attenuating abilities were stressed.

At first sight, a circuit diagram using a pi network may appear complex, but it is by no means mysterious to understand.

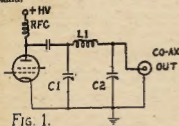


FIG. 1.

The circuit of Fig. 1 shows the network as used as a tank circuit.

C1 and L1 form the tuned circuit elements in much the same way as in a parallel tuned circuit, with the load appearing as a pure resistance across C2.

The loading on the tube is determined by L1 and C2, C1 being used to maintain the circuit at resonance when either of the other two elements is varied. Ideally, both L1 and C2 should be continuously variable as this permits adjusting the load on the tube while maintaining a desired value of Q. For a given Q, C1 would have the same value as in a conventional tank circuit and its value may be determined in the usual way.

If the load connected to the output in Fig. 1 is a pure resistance of known value, a fixed value for either L1 or C2 can be predetermined and the d.c. tube input then adjusted to the desired figure

by varying only one of these two circuit elements. C1 must be variable, of course, to maintain resonance.

If L1 is variable and C2 fixed, the optimum capacity of C2 is such that its reactance is equal to the resistance of the load connected to the output. It happens that when the load resistance is low, of an order of 50-70 ohms as normally used with co-axial cables, this value of capacity at C2 is just about right for maintaining the circuit Q within a reasonable range with most transmitting tubes, particularly those having an estimated plate load impedance of 5,000 ohms.

In actual amplifiers, where the Q may be higher, or with large tubes operated at reduced plate voltage, or with small tubes in parallel, with consequent lowered tube load impedance, the reactance at C2 may be considerably less than the nominal load impedance. Also, if the load is not a pure resistance, C2 has to be adjusted to cancel out the reactance. This may occur with a co-ax link at an aerial coupler unless the coupler correctly matches the link to the aerial.

Sometimes L1 is switched, by means of tappings, to each band and C2 is a continuously variable loading adjustment. This varies the Q of the circuit but is not objectionable, provided the tuning range is the same as is the case with the Amateur bands.

The value of C2 which will provide a given degree of loading on the amplifier depends on several factors. The lower the co-ax output impedance, or the higher the Q of the circuit, the greater

the capacitance required. Also, the higher the load impedance of the tube (given roughly by $500 \frac{E_b}{I_{bma}}$), the smaller the capacitance needed. Typical values of all elements for different bands and tube impedance are given in the accompanying tables. For example, a single 807 with a plate voltage of 600v. at a current of 100 Ma., would have an estimated load impedance of 3,000 ohms. At 7 Mc. C1 = 90 pF., L1 = 6.2 uH., and C2 = 700 pF. For 72 ohm output C2 would be slightly lower.

As in any amplifier to be operated at the higher frequencies, every effort must be made to reduce stray capacitances to a minimum, particularly those in parallel with C1.

Tube output and stray capacitances, plus the variable condenser's own minimum capacitance, add up to a considerable total, making it difficult to keep the circuit Q below 20 or more on 28 Mc. This will reduce the efficiency of the circuit due to heating of the coil, even though the actual tube efficiency may be as high as on the lower frequencies.

Whilst a pi network has very good harmonic attenuation, it will pass frequencies lower than the fundamental with greater ease than a conventional tank. Therefore, the p.a. should not be run as a doubler, nor should it be driven by a doubler unless link coupling is used with two tuned circuits. Also, an aerial coupler is desirable.

One major difficulty is the r.f. choke needed for parallel feed. This must present high impedance on all bands,

TYPICAL OPERATING CONDITIONS AND COMPONENTS FOR PI COUPLED AMPLIFIERS

	Band	Par. 807s	Single 807	813	2E26	
Estimated Plate Load (Ohms)		1,500	2,500	3,000	3,200	4,000
Plate Voltage		600	500	600	800	400
Plate Ma.		200	100	100	125	50
C1 in pF.	3.5	360	210	180	160	135
includes	7.0	180	105	90	50	70
strays	14.0	90	52	45	40	35
(Q = 12)	21.0	60	35	31	28	24
	28.0	45	26	23	20	18
L in uH.	3.5	6.5	10.5	12.5	14.0	15.0
	7.0	3.3	5.3	6.3	7.0	7.8
	14.0	1.5	2.6	3.1	3.5	4.0
	21.0	1.0	1.8	2.0	2.4	2.7
	28.0	0.8	1.3	1.5	1.7	2.0
C2 in pF.	3.5	2,100	1,500	1,400	1,250	1,100
for	7.0	1,050	750	700	630	560
50 Ohm	14.0	540	380	350	310	280
Output	21.0	350	250	230	210	190
	28.0	270	190	175	160	140

All values approximate.

$$\text{Estimated plate load impedance in ohms} = 500 \times \frac{\text{Plate Voltage}}{\text{Plate Current in Ma.}}$$

*C/o. Clifton Private Bag, Somerset, Tasmania.

without any series resonances near the bands. A suitable choke is described in the components' list of the transmitter and also in "QST" of May, 1954.

CIRCUIT OF THE TRANSMITTER

The grid circuit employs a multi-band tuner similar to that described in "A.R." for October, 1953. This was found to work as well as a switched or plug-in coil system. The drive is reasonably constant on all bands, being lowest on 14 Mc. where the circuit Q is highest. An 807 operated with about 450v. on its plate can easily supply the required grid drive, even when operated as a doubler. The coupling link should be as short as possible to avoid resonance effects in the link coils which produce heating of the link windings and co-axial cable. As tuning is fairly critical, a vernier dial is recommended.

The tube used is a type 828, though an 813 could easily be substituted, being slightly different physically and requiring no suppressor voltage. Often, an 813 is stable in this circuit, but if necessary, can be easily neutralised as shown by dotted lines in Fig. 2 and described in the A.R.R.L. Handbook.

Neutralisation should not be necessary with an 828, but if it is, proceed as for the 813.

The main tank coil L5 is wound on a 2 1/2" diameter Eddystone ceramic former and is tapped for the various bands. A separate small coil, L4, is used for 28 Mc. This is desirable as it is more readily adjusted to obtain the inductance required for tuning to 30 Mc. with C12 at minimum capacitance. Also, it avoids placing the input capacitance of L5 across C12. (This is even more important when a rotary inductance such as those used in the Command series of transmitters, or the aerial inductance from a BC375 is used for L5.) In addition, L4 can be wound with heavy wire or tubing, which is advantageous considering the higher Q which is unavoidable on 28 Mc.

The coupling condenser C10, and also C11, are 0.0004 uF. units from a BC375 tuning unit (two condensers in each unit). The value of these condensers should not be more than 0.0005-0.001 uF. if the amplifier is to be modulated.

C14 is a standard three section ceramic insulated A.W.A. tuning gang with all sections connected in parallel. C13 is only needed on 3.5 Mc., but should be able to carry considerable current. For 250 pF. mica condensers in parallel should be satisfactory, or a suitable condenser found in disposals, such as the one rated at 5 amperes at 3 Mc. used in this transmitter.

S1 is a large, ceramic job, also from a tuning unit. A standard Oak switch should be satisfactory if both sections are wired in parallel and it is not rotated when the high voltage is turned on.

C12 presents a problem. One section of a Calstat 120 pF. split-stator condenser was used, but it is rather bulky. The p.a. tuning condenser from a TUG tuning unit is 116 pF.

LAYOUT

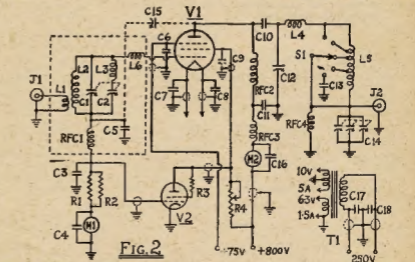
The amplifier is built on a standard 12" x 17" x 3" chassis with a 12" panel. The grid circuit is enclosed in an 8" x 5" x 3 1/2" aluminium box on the right of the chassis, with M1 above it.

The p.a. tuning condenser, C12, is mounted centrally, directly below the plate meter M2. C14 is mounted at the left, its control dial balancing with that of C1, C2, and S1 is mounted so that it will balance as nearly as possible with the grid meter.

The tube is mounted between the grid enclosure and C12. The 828 needs a cylindrical metal shield about 2" high around its base. Modern practice is to mount the tube socket about an inch above the chassis by means of small pillars. The various by-pass condensers are then connected between the socket pins and lugs mounted on the top of the chassis, with practically zero length leads. This reduces lead inductance to a minimum and keeps all r.f. currents within the plate tank enclosure.

L5 is mounted vertically between C12 and C14, with L4 spanning the gap between C12 and L5. The plate choke, RFC2, is mounted behind C12 and should be kept from metal surfaces in all directions. Keep all earth leads short and r.f. leads as short and heavy as possible. Copper strip 1/2" wide is preferable.

Shielded wire is used for d.c. and heater leads, a piece of co-ax being used for the high voltage. T1 can be mounted under the chassis if it is three inches or less in one direction, otherwise it can be placed at the rear of the chassis where it will require a perforated shield around it. V2 is placed to the rear of the grid compartment, in such a position that it does not obstruct J1.



- C1, C2—140 pF. microdimmers (ganged).
- C3—C7, C12—12 pF. mica.
- C8, C13—0.002 uF. mica.
- C9—500 pF. (or 0.01 uF. if C13 not used).
- C10—0.001 uF. 1,000 volt mica.
- C11—0.0005 uF. 2,500 volt mica.
- C12—150 pF. 3,000 volts (see text).
- C13—0.001 uF. mica (see text).
- C14—3 section A.W.A. ceramic tuning gang.
- C15—2.10 pF. neutralising condenser, 5,000 volt.
- C16, C17—0.005 uF. mica.
- M1, M2—30,000 ohms 2 watt.
- R1—47 ohms 1 watt.
- R2—30,000 ohms 50 watt, adjust. wire wound.
- RFC1, RFC4—2.5 mH. r.f. chokes.
- RFC2—115 turns No. 36 gauge enamelled wire, 3/4 inches long wound on 1 inch diam. polystyrene rod 6 inches long (see Ref. No. 8).
- RFC3—1.25 mH. 250 Ma. r.f. choke.

RFC4 is included as a precautionary measure, to prevent the high voltage appearing on the output circuit in the event of the failure of C10.

TUNING

Initial tuning should be done with reduced voltage. First, tune the grid circuit to obtain about 10 Ma. grid current. It is desirable to check the tuning with a wavemeter and mark each band, but it is practically impossible to tune the wrong band. Next, with C14 at maximum capacitance, C12 is tuned to the resonance dip. If a co-axial line to the aerial is used, C14 is then decreased in capacitance until the desired d.c. input is obtained, maintaining resonance with C12.

If a short co-ax line is used to the aerial coupler, commence as above, and when C12 is resonated, tune the coupler to resonance as indicated by the feeder current or by a rise in the plate current, then adjust the loading by means of C14 as before, checking the coupler tuning a couple of times and keeping C12 resonated.

When a long co-ax line is used to the coupler, it should be accurately matched as per A.R.R.L. Handbook.

Tuning the aerial coupler through resonance should cause the p.a. plate current to rise to a peak then drop away on the other side. If it does not, or if the current should rise when the coupler is detuned, it means that the co-ax line is not matched and adjustment of the number of turns on the link (or its position if a variable link).

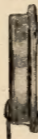
(Continued on Page 5)

- M1—0.50 Ma.
- M2—0.250 Ma.
- T1—Filament transformer, 10v. at 5 amp./6.3v. at 1.5 amp.
- S1—1 pole 5 position ceramic rotary (from BC375 tuning unit).
- L1—3 turns wound over cold end of L2.
- L2—13 turns No. 30, 1 inch long, 1 1/4 inch diam.
- L3—8 turns No. 16, 1 inch long, 1 1/4 inch diam.
- L4—Wound L2 and L3 are mounted at right angles to each other.
- L5—3 turns No. 10, 1 1/4 inch diam., 1 1/4 inch long.
- L6—24 turns No. 14, 3/4 inch diam. wound 7/8 turns per inch on Eddystone ceramic former. Tapped at two, four and eleven turns from plate end.
- L7—12 turns 8/16 inch diam., 1 inch long.
- V1—828 (or 813).
- V2—616 or 6Y6G.

MODEL "1XA" CRYSTAL MICROPHONE INSERT



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- Only carefully selected cements used throughout, to suit Australian climatic conditions.

TECHNICAL DETAILS

Rochelle salt crystal microphones are perhaps the most widely used for all types of service where quality speech and music reproduction at high output levels is a requirement. They are dependable in performance and when fitted with the appropriate "Zephyril" filter, their frequency response may be adjusted to suit any application or requirement.

This crystal microphone requires to be terminated with a high value parallel load of the order of 1 to 5 megohms for best results.

The mass of the moving parts is small, hence the sensitivity is high and a high efficiency is achieved.

Light gauge solder lugs are provided so that excessive heat in soldering will not be transmitted to the crystal element.

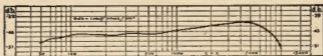
When mounted in a microphone cage, it is recommended that the insert be suspended in rubber, to eliminate shock and vibration.

One of the connecting lugs is directly connected to the case and care should be taken to solder the metal shield of the microphone cable to this solder lug, keeping the unscreened portion of the centre conductor as short as possible to eliminate hum pick-up.

All crystal elements are mounted on high grade suspension pillars, being fixed thereto with a good quality cement, thus ensuring stability and long life.

Case 1½" diameter (rear), ½" thickness, 1-13/16" overall diameter (front) with filter fitted.

Frequency Response = 60-6,500 c.p.s.
Output Level = -45 db (0 db = 1 volt/dyne/cm²)
Impedance = Model 1XA Grid 1 — 5 megohms.



Approximate Frequency Response Curve

AVAILABLE FROM ALL LEADING TRADE HOUSES

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PART FOUR

BY HANS RUCKERT,* VK2AOU

Fig. 5: After passing a shielded mains filter with four button-type 2,000 pF feed through ceramic capacitors and a pair of single layer chokes, the main voltage reaches four different power supplies. Immediately after switching on the power supplies shown in Fig. 5, the regulated bias voltage is present due to the selenium rectifier used here.

Since the regulator Stabilovolt 40 Ma. $4 \times 70v$. keeps the current constant, there was a handy way to get the supply for the stand-by relay (RX-TX relay). The other power supply switches all the filaments on, including those of the high voltage rectifier valves. We see again a voltage regulator for 80 Ma. and $4 \times 70v$.

Note the two current regulators EW and H. They are made of iron wire in a hydrogen atmosphere. One regulates the v.f.o. filament current of 0.7 amp. within 8-24 volts, and the other one keeps the current to the STV280V/80 Ma. constant over a voltage range of 85-225v.

Parallel to the electrolytic capacitors, which are in series, we have to place resistors which have a higher current going through than the leakage current through the capacitors, or we would overload the better one of the two and soon both would blow up.

Figure 6: Two further power supplies are shown on this drawing. We see again fuses on the primary as well as on the secondary side of each power supply, because these are cheaper than replacing burnt out transformers and rectifiers.

The same high voltage power supply is used for the p.a. and modulator final. The 2 x 800v. transformer is capable of 250 Ma. at 800v. d.c. if the mains voltage is not too far down. This is just enough to modulate the 100 watt input carrier to 95% on speech peaks. Running the final with more input would cause negative modulation because the power supply can't stand so much load.

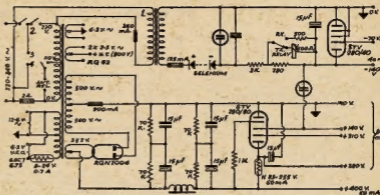


Fig. 5

The swinging choke was home-made out of an old vibrator transformer by widening the gap at the lamination and rewinding. The output voltage does not vary more than 5% with a load change of 120 to 250 Ma.

The hum filter uses two very small chokes which are tuned with 2 uF. capacitors to the 100 c.p.s. hum frequency.

Re-building of the transmitter last year took two weeks of my holidays to do the mechanical work and many more week-ends for wiring and aligning, plus even more time for special tests of interest.

In spite of poor DX conditions, 350 DX contacts have been enough to work 60 DX countries. The CQ to QSO ratio improved quite a lot, paying off for the effort.

With the receiver in the back yard and reduced sensitivity, the ratio between the fundamental on 14 Mc. and harmonics on 28 and 42 Mc. is as good as 100,000 to 1, and this without the mains and antenna low-pass filter. The old transmitter was not better than 100 or 1,000 to 1.

This description and construction is by no means the only way to solve

t.v.i. problems at the transmitter, but it includes many points which seem to be the logical answers and the writer followed often the methods outlined in "QST" and other publications. Not a penny was spent to re-build the transmitter, all the components were already in the old transmitter or could be found among the bits and pieces one collects after being an Amateur for 25 years.

*25 Berrille Road, Beverly Hills, N.S.W.

(Continued from Page 3)

will probably put matters right. When properly adjusted, it is possible to disconnect the co-ax at J2 without detuning C12 by more than a degree of rotation. The loading can be varied by C14 over a reasonable range without materially affecting the setting of C12, when working into a purely resistive load, after the manner of a variable link in a conventional tank circuit.

The efficiency of the pl network does not suffer by using a tapped or variable inductance (unless the unused portion is self resonant at the operating frequency). No heating of the coil when wound with 18 gauge wire was apparent, even with 100w. input, except a little on 28 Mc. where the Q is higher. Even here it was no greater than when previously using plug-in coils.

I have endeavoured to cover the subject as simply and fully as necessary to ensure a reasonable working knowledge of the circuit. Any queries which may arise, I would be glad to answer, within my capabilities, and I hope that greater interest may be aroused in Australia in a circuit which has become extremely popular overseas.

- (1) "Practical Applications of Pi Network Tank Circuits." Grammer, "QST," Jan., 1952.
- (2) "Pi Network Design Curves." Grammer, "QST," April, 1952.
- (3) "Pi Network Tank Circuits for High Power." Grammer, "QST," Oct., 1952.
- (4) "High Power Pi Network Amplifier with Parallel Tetrodes." Bridges, "QST," May, 1953.
- (5) "R.F. Chokes for High Power Parallel Feed." Chambers, "QST," May, 1954.

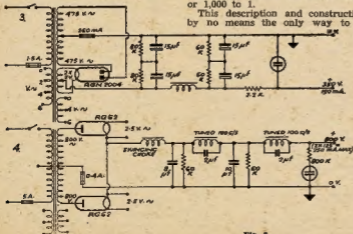


Fig. 8.

High-Level Clipping and Filtering

New Light on Clipper-Filter Behaviour

BY WARREN B. BRUENE, W0TK

HIGH-LEVEL filtering and "splatter filters" came into use several years ago for the purpose of preventing the radiation of spurious high-frequency sidebands. The high-frequency sidebands generated by over-modulating a plate-modulated amplifier were particularly bad, and the splatter filter^{1,2,3} resulted from the effort to attain a high modulation level without transmitting the splatter so well known in Amateur circles.

However, the explanations given for the operation of these circuits never quite satisfied the writer. While checking the function of the series-diode negative-peak limiter in the "splatter filter," WOJET found that the transmitted bandwidth was less in his transmitter with the diode removed, and he advanced a theory for the reason why. The writer investigated this theory and studied the general problem of high-level clipping and filtering. It is hoped that the following discussion will clear up much of the misunderstanding regarding the operation of splatter filters⁴ and indicate better methods of attaining the desired results.

• This discussion spotlights an inherent defect in the series-diode type of high-level clipper-filter system. The peculiar oscilloscope patterns obtained under certain conditions of modulation are readily explained by the author's analysis, and a better approach to high-level clipping and filtering is described.

cathode and that it appears as an open circuit if its plate gets negative with respect to the cathode. This means that when the voltage at the top end of the modulation transformer secondary, terminal P, swings higher, the diode V1 conducts and the voltage across R (the Class C final) and C will follow the voltage at terminal P. It will actually be just a few volts less due to drop across V1, but this is not significant.

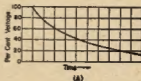
Now, for the purpose of analysis, let the voltage at P swing down to zero instantly. Diode V1 looks like an open circuit because the charge on capacitor C keeps some positive voltage on the cathode of V1 although its plate is at zero potential. Capacitor C discharges through R and the voltage across R (the plate voltage on the Class C final) decays in the usual exponential manner as shown in Fig. 3A. The envelope of the r.f. output for this example is shown in Fig. 3B. If the capacitance of C is increased or the resistance of R increased, the voltage will drop down at a slower rate. The product RC is known as the time constant of the circuit and this defines the rate of voltage decay.

FREQUENCY EFFECTS

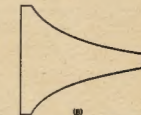
With this background let's see what happens with sine-wave audio modulation. When the audio frequency is very low, the voltage across R follows the voltage at point P over the entire cycle, because the downward voltage swing is so slow that C can discharge fast enough to keep from affecting the voltage across R. As the audio frequency is increased, a frequency is reached where the slope of the downward audio swing is steeper than the slope of the first part of the exponential curve shown in Fig. 3A. This shows up as diagonal clipping on the negative peaks, and it can be observed on an oscilloscope displaying the

r.f. envelope. As the audio frequency is increased, the voltage at terminal P and the voltage on the Class C final changes as shown in Fig. 4 at A, B and C for three different audio frequencies. The corresponding "scope patterns" are shown in Fig. 4 at D, E and F.

By examining the diagrams in Fig. 4 we can explain a couple of other things that happen with high audio frequency modulation. In Fig. 4B, for example, it is noted that the average plate voltage is higher than the power-supply voltage. Higher average voltage means higher plate current to the Class C final, and this partly explains why the plate current kicks up with modulation when a splatter filter is used. When a steady sine wave is applied as in Fig. 4B, the actual carrier power is increased by



(A)



(B)

Fig. 2.—(A) Behaviour of d.c. plate voltage on Class C amplifier when the plate-supply voltage is suddenly reduced to zero. (B) Corresponding oscilloscope pattern of r.f. envelope.

the square of the increase in average plate voltage. Fig. 4B is repeated in Fig. 5 with the dashed line showing the average d.c. plate voltage on the final for this condition of operation. This increased average plate voltage and corresponding carrier power is called "positive carrier shift." The extra carrier power comes from the Class B modulator and is rectified by the diode V1.

Another thing to notice is that the percentage modulation goes down with increasing audio frequency even though the audio signal on the modulator grids is maintained at the same level giving 100 per cent. modulation if diode V1 were shorted out. (It should be noted that we have been discussing conditions where the audio input level would normally give 100 per cent. modulation.) With lower audio signal levels the above results become less pronounced. This circuit thus acts somewhat as a filter in that the high audio frequencies are "attenuated," but this attenuation depends upon amplitude and is less with lower-amplitude audio tones.

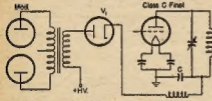


Fig. 1.—Series-diode negative peak limiter or "splatter preventer."

Now let's get to the heart of our subject and examine Fig. 1. This shows a plate-modulated Class C final with a diode in series with the high-voltage supply to the Class C plate circuit. This is the conventional splatter filter circuit with the filter left out. The Class C final tube looks like a pure resistive load to any positive plate voltage. With V1 in the circuit the modulated plate voltage cannot swing the plate voltage negative, so for our analysis we can replace the Class C final amplifier with a resistance as shown in Fig. 2. The other important element of the circuit is the capacitance of the Class C final plate feed to ground. Most of this capacitance is contributed by the plate tank-to-ground by-pass condenser.

Now we can inspect Fig. 2 and see how it performs. First let us note that the diode V1 conducts only when its plate is positive with respect to the

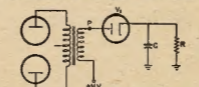


Fig. 2.—Equivalent circuit of Fig. 1, with resistor R replacing the modulating impedance of the Class C amplifier.

* Reprinted from "QST," November, 1961.

1—W. W. Smith, "An Effective Splatter Suppressor," *Radio*, October, 1940.

2—Thorderson, *Splatter Chokes and operating instructions*.

3—Chicago Transformer *Splatter Chokes and operating instructions*.

4—Howard W. Johnson, "Self-Filtered Peak Clipping," *QST*, April, 1948.

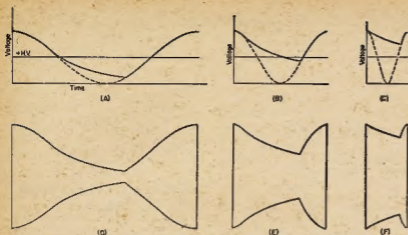


Fig. 4.—Instantaneous voltage, shown by solid curves in A, B, and C, at the plate of the Class C amplifier at various modulation frequencies when the series diode is used. A—moderately low frequency; B—moderately high frequency; C—very high frequency. The corresponding oscilloscope patterns of the r.f. envelope are shown at D, E, and F.

Fig. 6 shows this carrier shift due to rectification and the "attenuation" in the form of reduced modulation in an actual test case. The carrier shift and per cent. modulation drop will start at correspondingly higher audio frequencies if the 0.007 μ F. capacitor is reduced in value or if the Class C load resistance is reduced.

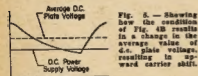


Fig. 5.—Showing how the condition of Fig. 4B results in a change in the average value of d.c. plate voltage, resulting in upward carrier shift.

Incidentally, the writer very carefully checked to see if it made any difference when the diode V1 was placed on the bottom side of the modulation transformer between the Class C final power supply and the modulation transformer secondary.⁴ The difference was always less than $\frac{1}{2}$ db. and did not favor either way consistently.

The other thing to notice is that the modulation is no longer a sine wave and takes on more of a saw-tooth shape. This waveshape contains harmonics of

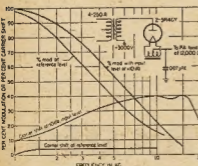


Fig. 6.—Carrier shift and modulation percentage versus modulating frequency in a representative set-up. The curves are referred to the signal-input level, at the grids of the Class B modulators, that gives 100% modulation at 1,000 c.p.s. without the series diode.

the fundamental audio tone so that the actual bandwidth of the r.f. signal is much greater. The extra sidebands generated might be called splatter, although they will not be found to extend across the band as far as the ordinary splatter does. But even though the higher audio frequencies are "attenuated," high-order harmonics are generated which spread out the signal.

WHERE TO CLIP

In Fig. 7 we have added the low-pass filter to give us the regular splatter filter circuit. Instead of just the simple capacitor C we have the whole low-pass filter. Figuring the time constant—or more correctly, the transient characteristics—of the filter with the load R becomes more complex, but the same type of patterns are observed on the 'scope as those shown in Fig. 4. The "time constant" of the filter varies with the value of m used in the filter design. The writer didn't go very deeply into determining the best value of m, but a few tests indicated that some value around 0.8 was best.

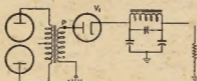


Fig. 7.—Complete splatter filter with series diode and low-pass filter. Resistor R is the modulating impedance of the Class C amplifier.

Now let's try to evaluate the performance of the splatter filter of Fig. 7 compared with the simple high-level filter shown in Fig. 8, which is the same except that the diode is omitted. The splatter filter does reduce splatter to a substantial degree compared with no filter at all, which is attested by its popularity. The writer found in a lab. set-up that using the diode did substantially reduce splatter if the modulators were capable of heavy over-modulation. If their power output cap-

ability was only enough to over-modulate the Class C final slightly, it made no difference whether the diode was used or not.

High-powered modulators, when using a splatter filter, will deliver more sideband power but this extra-heavy modulation is principally effective on the lower voice frequencies, which produce most of the audio power. However, the original research on speech clipping showed that much of the intelligibility contained in speech is in the consonant sounds, which are the higher audio frequencies, and that the vowels or lower voice frequencies can be reduced in amplitude several times without impairing intelligibility. Thus, it is better to use a modulator just capable of 100 per cent. modulation, along with some form of good speech clipping.

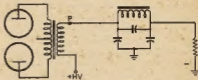


Fig. 8.—Low-pass filter for removing high-frequency components of Class B modulator output and thus preventing splatter. As described in the text, this type of circuit is highly effective when following a Class B modulator adjusted to clip both sides of the wave at or just below the 100% modulation level.

When using the splatter filter the high frequencies, starting from around the cut-off frequency of the filter and going higher, are rectified and cause part of the kicking up of the final plate current meter. However, most of the kicking up is from the heavy modulation of the low frequency positive peaks, which also cause the average d.c. plate voltage to increase on the final. It may be a thrill to see the modulators blush and the meters kick up, but the value in "getting out" better than a good speech clipper is very doubtful. To "get out" better some form of good speech clipping with modulation limited to just under 100 per cent. is a better solution.

One good place to do speech clipping is right in the plates of the Class B modulators.⁵ This can be done by raising the plate-plate load impedance on the Class B modulators until they are not quite capable of 100 per cent. modulation. This can be readily accomplished if a multitap modulation transformer⁶ is used. Another way is to lower the d.c. plate voltage on the Class B modulators (but not the Class C final) until they are just not quite capable of modulating the final 100 per cent. no matter how loudly you yell into the microphones. (Of course, the modulator bias should be reduced also to keep the proper modulator static plate current.) This adjustment should be made with the final loaded in the usual manner or slightly on the light side, because the clipping or plate-overloading level will increase a little in most modulators when the final is loaded more lightly.

Clipping right in the modulator stage reduces the problem of avoiding phase shift of the clipped waves because there

⁵—Woodrow Smith, "Simplified Speech Clipping," *"CQ,"* May, 1948.
⁶—Adjustable impedance modulation transformers, such as the Multi-tap, Vari-tap, Poly-Pedance modulation transformers.

is nothing left to shift phase except the modulation transformer and the high-level filter.⁷ To avoid unnecessary "tipping" of the top of the clipped wave a modulation transformer with good low-frequency response, along with only one section of filter, is recommended. The filter section should be designed with an m of 0.8 or, perhaps better yet, may be a constant-k or simple pi-section filter shown in Fig. 8 doesn't cut off as sharply as the m-section type, but it gives better attenuation farther out, which is more important.

Incidentally, a heavily-clipped wave approaches a square wave in shape and a modulator capable of 100 watts sine-wave output will deliver nearly 200 watts of square-wave output. This helps explain why a transmitter with good speech clipping carries the punch that it does. This isn't hard on the modulator tubes either because their plate efficiency is much higher when passing a clipped wave, so the plate dissipation is nearly the same with either sine-wave or square-wave modulation.

It will be hard on the modulator tubes to run frequency-response tests at 100 per cent. sine-wave modulation up beyond the cut-off frequency of the filter because above cut-off they see essen-

⁷—It is hoped that the effect of phase shift on clipper-filter performance can be discussed in detail in a subsequent article.

tially just the input capacity of the filter, but with voice modulation they can take it. If you want to make life easier for the modulator tubes, put a low-pass filter⁸ up in the front end of the speech amplifier and choose the cut-off frequency of the high-level filter to be a little higher than that of the filter in the front end.

The writer made many tests in the laboratory using all sorts of equipment to test out this theory of high-level clipping and filtering. Also, on-the-air tests at WJZET and WOTTK confirm the theory. Many interesting things were discovered during the tests, but space will only allow the basic discussion which has been presented.

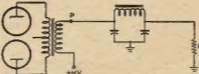


Fig. 8.—Similar to Fig. 5, except that a constant-k filter section replaces the m-derived section of Fig. 5. Formulas for designing both types of sections may be found in The Radio Amateur's Handbook.

In conclusion, the writer wishes to point out again that some good form of speech clipping that clips both the positive and negative audio peaks, followed by a single-section high-level filter, will give about all that can be practically obtained in the way of heavy modulation without splatter.

⁸—Chicago Transformer LFF-1, for example.

Careful choice or adjustment of the modulator plate load impedance to limit the modulator power output is well worth while. For example, when using Class B 810s in a 1-kw. transmitter with 2250 to 2500 volts on them, the plate-to-plate impedance should be about 18,000 ohms instead of 12,000 ohms, to limit the sine-wave output to 500 watts. In addition to better performance, this system is more economical since the cost of several parts is saved and the high voltage peaks on the Class C tank circuit are kept down to normal.

— . . . —

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BRIGHT STAR RADIO

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Integral Crystal Calibrator for Superhet. Receivers

BY S. J. LLOYD,* VK3AST

A BUILT-IN Crystal Calibrator is a useful addition to any communication receiver, but the use of an extra tube for this purpose alone is not always economically possible. In a superhet. receiver, however, the beat frequency oscillator, if suitably modified, can be made to provide calibration points by feeding its harmonics back into the mixer stage.

The average receiver b.f.o. is not suitable as it stands, for two reasons: Firstly, the frequency is usually variable over a small range, and even if not deliberately adjustable, is unlikely to be sufficiently accurate for frequency reference; secondly, its nominal frequency is generally inconvenient for calibration purposes, e.g. 455 or 1600 Kc.

The first defect can be remedied by converting the b.f.o. to a crystal oscillator; a fixed beat frequency is no great disadvantage, and the actual note can be set to any desired pitch during alignment. It can still be varied over a small range, within the i.f. passband, by the receiver tuning. The second disadvantage can be overcome by altering the intermediate frequency, and therefore the beat frequency, to the nearest round figure suitable for calibration purposes. In a receiver with a crystal filter, however, new filter crystals would be required, and it would be better to choose the b.f.o. crystal to suit the i.f., accepting the inconvenience of oddly spaced check points.

monic of a 500 Kc. b.f.o. taken for the beat frequency; in this case a 1500 Kc. crystal could be used in the b.f.o., but the harmonics would be too far apart for accurate calibration.

A double superhet with a second intermediate frequency of the order of 100 Kc. can have a 100 Kc. sub-standard crystal in the b.f.o., giving accurate check points every 100 Kc.

It would also be possible to use such a crystal in receivers with a higher i.f., using the appropriate harmonic (fifth or fifteenth) for the beat frequency; this method has not, however, been tried out, and careful screening would be needed to suppress spurious beats.

If break-through on the altered intermediate frequencies should not be troublesome if a series wavetrap is used, and the screening is adequate.

B.F.O. CIRCUIT

The beat frequency oscillator circuit must be chosen to suit the tube to be used and the activity of the crystal, and should be capable of producing high order harmonics. If the fundamental frequency of the crystal is used for the beat frequency, a tuned circuit is not required; the circuit shown in Fig. 2 has been found suitable for a 500 Kc. crystal and an EF50.

OSCILLATOR INJECTION

The method of coupling the harmonics of the b.f.o. into the mixer stage of the

ably insufficient to cover the altered frequency, and some modification is needed. 455 Kc. transformers can be changed to 500 Kc. by removing turns from the windings, whereas 1600 Kc. transformers will need added parallel capacity to lower them to 1500 Kc. A grid-dip oscillator covering the required range simplifies the conversion.

ADJUSTMENT

With the b.f.o. crystal oscillating, its exact frequency is checked against a standard frequency transmission or reliable frequency meter. If it is not exactly on its nominal frequency, some adjustment is possible by such means as adding extra capacity in parallel, or "loading" the crystal. If it is close to the nominal figure, however, it is simpler to calculate a correction factor to be applied when particular accuracy is required.

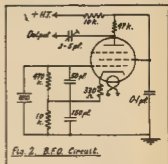


Fig. 2. B.F.O. Circuit.

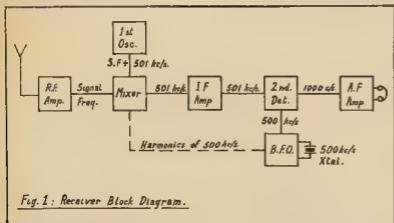


Fig. 1: Receiver Block Diagram.

CHOICE OF I.F.

A receiver intermediate frequency of 455 Kc. can conveniently be altered to 500 Kc. plus or minus the desired audio beat frequency, and an easily obtained 500 Kc. crystal used in the b.f.o.

The crystal fundamental provides the beat note, and the harmonics supply calibration points at intervals of 500 Kc. throughout the tuning range of the receiver.

Similarly, an i.f. of 1600 Kc. can be converted to 1500 Kc., and the third har-

monics will depend on the design of the latter. Simple capacity coupling to the mixer grid, by a small neutralising condenser, is satisfactory; it may be difficult, however, to get adequate injection of harmonics at the h.f. end of the tuning range without overcoupling at the l.f. end. If a spare wafer is available on the band-change switch, a separate coupling condenser for each band is preferable.

I.F. TRANSFORMERS

The range of adjustment provided in the receiver I.F. transformers is prob-

ably insufficient to cover the required beat note with the crystal frequency; e.g. for a beat note of 1000 c.p.s. They are peaked at 1 Kc. above or below the b.f.o. The actual note can be varied by the receiver tuning, as long as it is kept within the i.f. passband.

The coupling between the b.f.o. and the mixer is adjusted to give just enough signal strength on calibration points at the h.f. end of the receiver tuning range.

PERFORMANCE

The arrangement here described has been used for some years in a home-built superhet, using a 500 Kc. crystal in the b.f.o. and an i.f. of 501 Kc. No trouble was experienced with i.f. break-through or spurious beats, and useful calibration points were obtained every 500 Kc. throughout the range from 3.5 to 14 Mc.

An incidental advantage of the system is that the receiver first oscillator can be used to provide a calibrated test signal, as its frequency is always exactly 500 Kc. above the reading of the tuning dial.

* "Tullamore," Humphries Road, Frankston, Vic.

THE SLOT BEAM

BY B. SYKES, G2HCG

Recent developments in Band III television aeriels have led to the combination of the Yagi and skeleton slot aeriels. The result has the advantages of both types without the disadvantages of either.

The fundamental problem with the Yagi is the great reduction in feed point impedance when parasitic elements are added to the simple dipole. This means that when tuning up such an array, it is necessary to adjust the matching at the same time as the elements are tuned to length and the spacing altered. This almost always results in a Yagi with the spacing adjusted for optimum matching rather than optimum gain. Further complications arise when attempts are made to stack Yagis and it is frequently found that two perfectly good four element Yagis giving, say, 8.5 db gain each, flatly refuse to give a further 3.5 db when stacked. The problem again is that of impedance matching. A suitable matching system is of necessity somewhat complicated, both electrically and mechanically.

The search for simplicity and wide bandwidth led to further investigations into the operation of the skeleton slot aerial. The results indicated that parasitic reflector and director elements could be used with the skeleton slot aerial. In addition, the bandwidth was greatly increased by the use of a non-frequency sensitive delta-matching system.

Further examination of the operation of the skeleton slot indicates that the centre portions of the vertical sections

are simply transmission lines feeding two bent dipoles consisting of the horizontal sections and the ends of the vertical sections. The important point to note is that the dipole can "choose" its own length to suit the operating frequency; in other words, the point at which the vertical sides of the skeleton slot cease to be transmission lines and become the ends of a bent dipole is governed by the frequency and not by the size of the aerial. There is, of course, a limit but the bandwidth can be very wide indeed.



Fig. 1.—A typical six-over-six slot beam. The gain is 12 db over a dipole, the back to front ratio 40 db, and the horizontal beam width 50°.

The skeleton slot, therefore, consists of two stacked end-fed dipoles. The addition of parasitic elements to an end-fed dipole does not alter the feed impedance, but the tuning, i.e., the length of the dipole does alter. Since the dipoles in a skeleton slot array can "choose" their own lengths, it follows

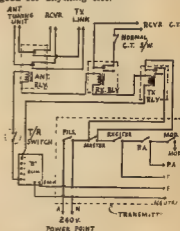
that a skeleton slot can be converted into a stacked Yagi with no matching complications. This is confirmed in practice where such an array may be set-up giving a standing wave ratio of 1.2/1 and reflectors and directors added and tuned for maximum field strength, increasing the forward gain by about 10 db. It is then found that the standing wave ratio has not altered. The age-old problem of matching Yagis and stacked Yagis is therefore solved and all elements can be tuned for maximum radiation with no fear of feed-point impedance changes.

Single Switch Control

BY H. G. WOHLERS, VK3YV

Making The Old "B" Eliminator Extremely Useful

Many Amateurs today have in their junk pile an old "B" battery eliminator and also several disposals relays of the 24-28 volt high resistance type. These relays can be operated satisfactorily by connecting them in series in banks of 1, 2, 3 or 4 across the output of an old "B" eliminator (tapped type preferable). Sure, it is realised that the regulation of these eliminators is lousy and because of that they are not much good for anything else.



NOTE: To "REL" WITHOUT ANY TURN "PA" S/W OFF. TURN "MASTER" S/W ON.

The following is a set-up which has been in use in my shack for at least seven years and has never failed yet. It has given every satisfaction and can be varied in a 100 different ways to suit any Amateur's requirements. After hours of use neither the relays nor the eliminator show any signs of warming up and the original rectifier valve is still in use.

Don't worry about voltages and currents as I have used all sorts and types of relays (except low resistance types) with excellent results. In any case, for those who are interested, it is one good way of making use of disposals relays and old eliminators to operate your station with single switch control.

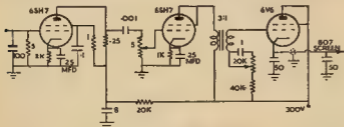
1107 Templeton Street, Wangaratta, Vic

GATED SCREEN MODULATION

BY S. C. BURTON, VK2AYB

Having experimented with clamper and transformer screen modulation, it was found that adjustments were critical, especially when changing bands. With the gated screen, these troubles disappeared. The writer is at present using this method to screen modulate a pair of 807s in parallel and obtaining very pleasing results.

The voltage on the final screen is adjusted to 160 volts by the 20,000 ohm potentiometer at the bias end of the transformer secondary. The transformer is an old 3 to 1 interstage job. Audio gain is controlled by the 0.5 meg. potentiometer in the grid of the 6SH7 triode. The circuit diagram and remarks should give a fair indication of opera-



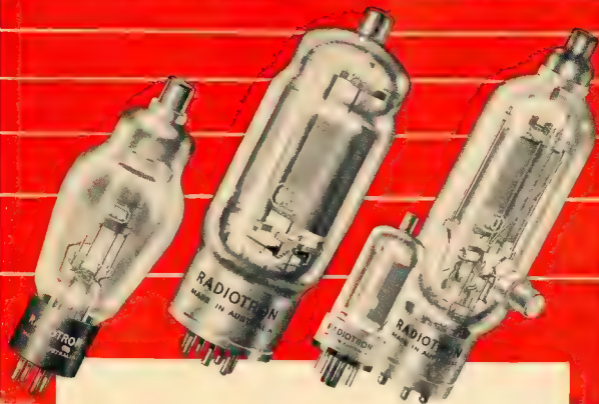
The circuit is simple and sure-fire. The only adjustment is that the loading to the final should be increased to give a small upward kick on the plate meter under modulation. This will necessitate, in most cases, heavy coupling to the antenna coupler.

+ 52 Arcadia Street, Penhurst, N.S.W.

tion. Suffice to say it will modulate a pair of 807s 80% to 100% at all times.

The loading adjustment seems the most critical adjustment, but once set for any band, should not require altering. Grid drive has some effect on output, but is set at 5 Ma. at this station for 80 watts input.

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Official List for VK DX Contest and the VK DXCC Award

AC3-Sokkum	(22)	HC8-Galapagos Is.	(10)	PK6-Celebes and Molucca Is.	(28)	VR1-Gilbert and Ellis Is. & Ocean Is.	(31)
AC4-Tibet	(23)	HE-Liechtenstein	(14)	PP-Andorra	(14)	VR2-Fiji Is.	(32)
AP-Pakistan	(21, 22)	HH-Haiti	(8)	PY-Brazil	(11)	VR3-Fanning Is. Group	(31)
BV (C3)-Formosa	(24)	HI-Domin. Republic	(8)	PZ1-Nether. Guiana	(9)	VR4-Solomon Is.	(28)
C (unofficial)-China (23, 24)		HK-Colombia	(9)	SM-Sweden	(14)	VR5-Tonga (Friendly) Is.	(32)
C3-See BV.		HK0-Archipelago of San Andres and Providencia	(9)	SP-Poland	(15)		
C3-Manchuria	(24)	HL-Korea	(25)	ST-Anglo-Egyptian Sudan	(34)	VR6-Pitcairn Is.	(32)
C3-Chile	(12)	HP-Panama	(7)	SV-Egypt	(34)	VS1-Singapore Is.	(28)
CE7Z, LU, VK1, VP8-Antarctica (13, 29, 30)		HR-Honduras	(7)	SV-Greece	(20)	VS2-Malaya	(28)
CE0-Easter Island	(12)	HS-Siam	(26)	SV-Crete	(20)	VS4-Sarawak	(28)
CM, CO-Cuba	(8)	HV-Vatican City	(15)	SV-Dodecanese	(20)	VS5-Bruni	(28)
CN2, KT1-Tangier Zone	(33)	HZ-Saudi Arabia	(21)	TA-Turkey	(20)	VS6-Hong Kong	(24)
CN8-French Morocco	(33)	II-Italy	(15)	TF-Iceland	(40)	VS8-Aden & Socotra	(21)
CP-Bolivia	(10)	II-Trieste	(15)	TG-Guatemala	(7)	VS9-Maldives Is.	(22)
CR4-Cape Verde Is.	(35)	I5, MS4-Italian Somali-land	(37)	TI-Costa Rica	(7)	VS9-Sultan of Oman	(21)
CR5-Port. Guinea	(35)	IS1-Sardinia	(15)	TI8-Cocos Is.	(7)	VU2-India	(22)
CR5-Principe, Sao Thome	(35)	JA, KA-Japan	(25)	UA1, 3, 4, 6-European R.S.F.S.R. (15, 16, 17)		VU3-Laccadive Is.	(22)
CR8-Angola	(36)	JY, ZC7-Jordan	(20)	UA9, 0-Asiatic R.S.F.S.R. (17, 18, 19, 25)		VU5-Landman and Nicobar Is.	(26)
CR7-Mozambique	(37)	JZ0-Netherlands New Guinea	(28)	UB5-Ukraine	(16)	XE-Mexico	(8)
CR8-Goa (Port. India)	(22)	K, W-United States of America (3, 4, 5)		UC2-White Rus. S.S.R.	(16)	XZ-Burma	(26)
CR8-Macau	(22)	KA-See JA.		UD6-Azerbaijan	(21)	YA-Afghanistan	(21)
CR10-Port. Timor	(28)	KB6-Bonin and Volcano Is.	(27)	UE8-Georgia	(21)	YL-Iraq	(21)
CT1-Portugal	(14)	KB8-Baker, Howland and Amer. Phoenix Is.	(31)	UE8-Armenia	(21)	YN-Nicaragua	(7)
CT2-Azores Is.	(14)	KC4-Navassa Is.	(8)	UE8-Turkoman	(21)	YO-Roumania	(20)
CT3-Madeira Is.	(33)	KC8-East. Caroline Is.	(27)	UE8-Uzbek	(17)	YS-Salvador	(7)
CX-Uruguay	(18)	KC8-West. Caroline Is.	(27)	UE8-Tadzhik	(17)	YU-Yugoslavia	(15)
DU, DL, DM-Germany (14, 15)		KC8-Guantanamo Bay	(8)	UL7-Kazakh	(17)	YV-Venezuela	(9)
DU-Philippine Is.	(27)	KG6-Mariana Is.	(27)	UM8-Kirghiz	(17)	ZB1-Malta	(15)
EA-Spain	(14)	KH6-Hawaii Is.	(31)	UN1-Karelo-Finnish Republic	(16)	ZB2-Gibraltar	(14)
EA0-Balearc Is.	(14)	KJ6-Johnston Is.	(31)	UO5-Moldavia	(18)	ZC2-See VK1.	
EA8-Canary Is.	(33)	KL7-Alaska	(1)	UP2-Lithuania	(15)	ZC3-Christmas Is.	(29)
EA9-Irni	(33)	KM6-Midway Is.	(31)	UR2-Latvia	(15)	ZC4-Cyprus	(20)
EA8-Rio de Oro	(33)	KP6-Puerto Rico	(8)	VE2-Estonia	(15)	ZC5-Br North Borneo	(28)
EA8-Span. Morocco	(33)	KP6-Palmyra Group, Jarvis Is.	(31)	VE, VO-Canada (2, 3, 4, 5)		ZC6-Palestine	(20)
EA0-Span. Guinea	(35)	KR6-Ryukyu Is.	(25)	VK1-Australia	(29, 30)	ZC7-See JY.	
EI-Eire	(14)	KS4-Swan Is.	(7)	VK1, ZC2-Cocos Is.	(29)	ZD1-Sierra Leone	(35)
EL-Liberia	(35)	KS6-Amer. Samoa	(32)	VK1-Heard Is.	(39)	ZD2-Nigeria	(35, 36)
EQ-Iran	(21)	KV4-Virgin Is.	(8)	VK1-Macquarie Is.	(20)	ZD3-Gambia	(35)
ET2-Eritrea	(37)	KW6-Wake Is.	(31)	VK9-Norfolk Is.	(32)	ZD4-Gold Coast, Br. Togoland	(35)
ET3-Ethiopia	(37)	KX6-Marshall Is.	(31)	VK9-Papua Territory of New Guinea	(28)	ZD6-Syassland	(37)
F-France	(14)	KZ5-Canal Zone	(7)	VO-See VE.		ZD7-St. Helena	(36)
FA-Algeria	(33)	LA, LB-Jan Mayen	(40)	VP1-Br. Honduras	(7)	ZD8-Ascension Is.	(36)
F88-Amsterdam and St. Paul Is.	(38)	LA, LB-Norway	(14)	VP2-Leeward Is.	(8, 9)	ZD9-Tristan da Cunha and Gough Is.	(38)
F88-Kerguelen Is.	(39)	LA, LB-Svalbard	(40)	VP2-Windward Is.	(8, 9)	ZE-South. Rhodesia	(38)
F88-Madagascar	(39)	LU, Z-See CE7Z, VK1, VP8-LU-Z-See CE7Z, VK1, VP8-LX-Luxembourg	(14)	VP3-Brit. Guiana	(9)	ZK1-Cook Is.	(32)
FC-Corsica	(15)	LZ-Bulgaria	(20)	VP4-Trinidad and Tobago	(9)	ZK2-Niue	(32)
FD-Fren. Togolande	(36)	M1-San Marino	(15)	VP5-Cayman Is.	(8)	ZL-New Zealand	(32)
F8-Fr. Cameroons	(36)	MP4-Bahrain Is.	(21)	VP5-Jamaica	(8)	ZM6-British Samoa	(32)
F8-Fr. West Africa	(36)	MP4-Kuwait	(21)	VP5-Furks and Caicos Is.	(8)	ZM7-Tokelau (Union) Is.	(31)
FG-Guadeloupe	(8)	MP4-Qatar	(21)	VP8-Bahamas	(8)	ZP-Paraguay	(11)
F18-Fr. Indo China	(26)	MP4-Trucial Oman	(21)	VP8-Bahama Is.	(8)	ZS1-2, 4, 5-Union of South Africa	(38)
FK8-New Caledonia	(32)	MS4-See IS.		VP8-See CE7Z, VK1, LU-Z-See Falkland Is.	(13)	ZS2-Marion Is.	(38)
FL8-Fr. Somalland	(32)	OA-Peru	(10)	VP8-Falkland Is.	(13)	ZS3-Sth. West Africa	(38)
FM-Martinique	(8)	OB-Lebanon	(15)	VP8-South Georgia	(13)	ZS7-Swaziland	(38)
F08-Clipperton Is.	(7)	OE, MB9-Austria	(15)	VP8, LU-Z-South Orkney Is.	(13)	ZS8-Basutoland	(38)
F08-Fr. Oceania	(32)	OH-Finland	(15)	VP8, LU-Z-South Shetland Is.	(13)	ZS8-Bechuanaland	(38)
FP8-St. Pierre & Miquelon Is.	(5)	OK-Czechoslovakia	(15)	VP8, LU-Z-South Sandwich Is.	(13)	3A-Monaco	(14)
FQ8-Fren. Equatorial Africa	(36)	ON4-Belgium	(14)	VP8, LU-Z-South Shetland Is.	(13)	3V8-Tunisia	(33)
FR7-Reunion Is.	(36)	OQ5, 0-Belgian Congo	(36)	VP9-Bermuda Is.	(5)	4S7-Ceylon	(22)
FUS, VJ-New Hebrides	(32)	OG-Greenland	(40)	VQ1-Zanzibar	(37)	4W1-Yemen	(21)
FW8-Wallis and Futuna Is.	(32)	OY-Faeroes	(14)	VQ2-Rth. Rhodesia	(38)	4X4-Israel	(20)
FY7-Fr. Guiana and Inini	(9)	OZ-Denmark	(14)	VQ3-Tanganyika Terr.	(37)	5A-Libya	(34)
G-England	(14)	PAD-Netherlands	(14)	VQ4-Kenya	(37)	9S4-Saudi Arabia	(38)
GC-Channel Is.	(14)	PJ2-Neth. West Indies	(8)	VQ5-Uganda	(37)	-Siadra Is.	(38)
GD-Isle of Man	(14)	PK1, 2, 3-Java	(28)	VQ6-Br. Somaliland	(37)	-Bhutan	(22)
GI-Northern Ireland	(14)	PK4-Sumatra	(28)	VQ6-Chagos Is.	(39)	-Comoro Is.	(30)
GM-Scotland	(14)	PK5-Nether. Borneo	(28)	VQ8-Mauritius	(39)	-Fridtjof Nansen L.	(40)
GW-Wales	(14)			VQ8-Mauritius	(39)	-Kermadec Is.	(32)
HA-Hungary	(15)			VQ9-Seychelles	(39)	-Mongolia	(23)
HB1, 9-Switzerland	(14)					-Nepal	(22)
HC-Ecuador	(10)					-Wrangel Is.	(19)

AMATEUR CALL SIGNS

FOR MONTH OF SEPTEMBER, 1955

NEW CALL SIGNS

- VK— New South Wales
 2NV—C. Welsh, C/o Miss Lindsay, 98 Staples St. Kingsgrove.
 2AMN—R. D. Martin, 172 Lane St. Broken Hill.
 2AOC—J. J. King, 84 Anderson St. Chetwood.
 2ZBF—J. G. Pratt, "Inglewood," R.M.B. 23, Ilbaho.
 2ZBT—G. T. Adams, 14 Early St., Queanbeyan.
 Victoria
 8FP—D. Burckett, Main Rd., Doncaster.
 3ADZ—G. M. Delahoy, Eden Park Rd., Whitless.
 3OLU—L. E. Lloyd, Murray Valley Highway, Nyah South.
 2EAO—R. A. Bailey, 15 Riverside Rd., Ivanhoe.
 Queensland
 6TF—J. C. Fairweather, Broad St., Labrador.
 South Australia
 4DJ—D. G. Goode, Yankallilla.
 Western Australia
 6NJ—B. Bellington, 97 Grosvenor Road, Mt. Lawley.

CHANGES OF ADDRESS

- VK— New South Wales
 2KJ—A. T. Noon, Postal: 29 Oakfield Rd., Glenhumbly, S.E.S. Victoria.
 2EZ—W. G. Spensker, Station 27 Kardinia Rd., Clifton Gardens, Postal: 17a Stanley Ave., Moesman.
 2LJ—M. P. Moore, 10 Millford St., Randwick.
 2QI—C. Boulter, Station S.S. "Barroola," Postal Address 23 Castle St., Randwick.
 2AJY—J. K. Fullagar, Dr., 426 Orange Grove Rd., Booker Bay, via Woy Woy.
 2ANH—N. H. Micks, 1 Kitchener St., Oakley.
 2AQB—R. B. Digby, 60 Queens Pde., Newport.
 2APZ—R. L. Kerdel, 256 Main St., Broken Hill.
 2AQC—R. E. Gunnurrie, 251 New South Head Rd., Edgecliffe.
 2AQP—M. Powell, 11 Bridge Rd., North Ryde.
 2AQN—C. Scott, 56 Seventh St., New Lambton, Newcastle.
 2ASM—W. C. Clarke, 5 Beacon Ave., Brookvale.
 2AWE—R. M. Weston, 127 Anzac Pde., Kensington.
 2AXE—E. Curruthers, Station Plat 16, Hedingley, The Glenside, Elizabeth Bay, Sydney, Postal: Box 1189, G.P.O., Sydney.
 2AXB—R. B. Smith, 28 Prospect St., Carlton.
 2ZAS—B. D. Russell, 310 Urbans Bridge Rd., Tempe.
 Victoria
 3DC—D. G. Caldwell, Lot 49, Montgomery Ave., Bynold.
 3FI—H. R. Fitzsimmons, 13 Leithen St., Shepparton.
 3RI—K. E. Olsson, 6 Kelong Rd., Nth. Balwyn.
 3ARO—R. C. Pulford, St. Helena Rd., Greensborough.
 3ASH—R. R. Ekin, 496 Moorabel St., South Geelong.
 3ZBH—R. J. Harrison, Railway Pde., Glenroy.
 Queensland
 4BL—W. A. Easterling, 10 St. Peters St., St. Peters.
 4BX—G. J. Walker, 23 Hughes St., Hermit Park.
 4CA—D. J. Cox, 21 Anzac Ave., Toowoomba.
 4SE—S. E. Moien C/o Radio Station 4LG, Craimele, Longreach.
 4TF—R. C. Tow, 5 Hooper St., Boonah.
 South Australia
 6GE—R. G. Pitts, Flying Doctor Base, Vincent St., Port Augusta.
 6SC—B. G. Perkins, 26 Ways Rd., Hampstead Gardens, Adelaide.

Western Australia

- ELJ—J. Mead, 68 Alexander St., Wembley.
 6WI—Wireless Institute of Australia (A. Div.), Station, 110 Edensorburg St., Mt. Hawthorn, Postal Box N1002, G.P.O., Perth.
 Tasmania
 7TC—P. C. Harland, Station: 12 Wellesley St., South Hobart; Postal: 42 Wellesley St., South Hobart.
 7WG—G. Gough, 111 Pottery Rd., Lenah Valley.

Territories

- 9AS—J. A. Whitaker, Station A.P.C. Oil Exploration Station, Upper Bannu River, Postal Seismic Five, C/o A.C.C., Port Moresby.

CANCELLED CALL SIGNS

- 2VM—D. W. McDonald.
 2XL—C. P. Pickup.
 2AOC—T. T. Ralph.
 2AIF—J. C. Fairweather, Now VK4FF.
 2APN—D. G. Littlejohn.

Victoria

- 3YA—A. R. Young.
 3ACW—C. Welsh, Now VK2MV.
 3AGO—E. C. Sloan.
 3AOF—F. P. O'Dwyer.
 South Australia
 3TM—R. D. Martin, Now VK2AMN.
 Territories
 1DY—C. E. Delahoy, Now VK3ADZ.
 30X—L. J. King, Now VK3AOK.
 8FF—P. T. Filmer.

FOR MONTH OF OCTOBER, 1955

NEW CALL SIGNS

- VK— New South Wales
 2SD—L. W. N. Squires, Portable, C/o. 27 Fletcher St., Bondi.
 2AGE—G. A. Dowse, 6 Bangalow Rd., Ballina.
 2AJN—A. J. Myers, 315 Pennant Hills Rd., West Pennant Hills.
 2AQA—H. L.A.A. Regt. R.A.A., Chandler St., Kogarah.
 2AYA—Q. A. Ahlstrom, 21 Malville St., Strathfield.
 2ZBB—G. P. Pearson, 17 Esher St., Burwood.
 2ZBD—J. L. Cumming, 8 Sorlie Port, Castlereagh.
 2ZBP—B. C. Fleck, 26 Yooloola St., Griffith S.S.
 Victoria
 2TK—J. K. Herd, Portable, C/o. Reid St., Warragatta.
 3PD—W. R. Moffatt, 1 Rothway Ave., Box Hill South.
 3AJX—A. R. Fernman, 2 Edward St., Norham.
 3AKU—M. J. Doolan, 29 Erene St., Colac.
 3AWV—E. J. Love, 37 Bishop St., Oakleigh.
 3AZB—A. W. M. Buest, 5 Torrens Rd., Frankston.
 3ZBA—W. A. Ferres, 26 Jeffers St., Noble Park.
 Queensland
 4BB—S. K. Howard, Portable, C/o. 40 Branyan St., Bundaberg.
 4IH—I. H. Mullins, Talley St., Thursday Island.
 4ND—N. G. Dangerfield, 23 Graham St., Ayr.
 4OC—E. B. Connor, Casewary St., Longreach.
 4XD—F. W. Nutt, Station Mulgrave Rd., Earlville via Cairns; Postal: C/o. Broadcast Station 4CA, Cairns.
 South Australia
 5ZAP—O. R. Pope, 15 Seaview Gr., Blair Athol.
 Western Australia
 6JH—J. W. Hughes, 373 Marine Drive, Geraldton.
 6MN—G. Miles, 31 The Avenue, Nedlands.
 6RB—E. F. Robins, 148 McDonald St., Joondanna Heights.
 6ZAT—T. C. Berg, 72 Fourth Ave., Mt. Lawley.

Territories

- 6AB—A. B. Hunting, Station 8 Mile, Rouna
 38, Port Moresby, Postal: P.O. Box 38, Port Moresby.
 9SD—S. D. D. Sutherland, Station: Cr. Yarra Ave. and Tavist 31, Rahaul; Postal: C/o P.O. Box 15, Rahaul.

CHANGES OF ADDRESS

- VK— New South Wales
 2ZS—A. H. Outtrim, 30 Boomerang Rd., Springwood.
 2IY—T. H. Cahill, C/o. Milparinka P.O.
 2JL—J. H. Archibald, 25 Vista St., Sans Souci.
 2TJ—J. W. Thompson, 11 Temple St., Stanmore.
 2ACK—C. Jeffery, 34 Walters Pde., Hurstville.
 2ALD—R. P. Smith, 47 Denman St., Cronulla.
 2AGP—R. B. Pomeroy, Flat 22, Salford Centre, Love St., Queanbeyan.
 2ARI—R. H. H. Beech, 46 Henley Rd., Flemington.
 2AWO—W. H. Field, Postal: 10 William St., Double Bay.
 2AXD—A. A. Drullit, 43 Canal St., Griffith.
 2ZAN—W. H. Eardley, 146 Blismuth St., Broken Hill.

Victoria

- 3FO—C. R. Gilson, High St., Malden.
 3ABA—J. O. Ball, 20 Relove Cres., Box Hill North.
 3AFK—P. C. Perkins, 29 Richmond St., Geelong East.
 3AGK—R. J. Hildebrand, 101 Tambet St., East Bendigo.
 3AYS—W. R. Stoddard, 18 Alexandra Ave., Elsternwick.
 3AZC—L. Cunningham, 133 Gordon St., Traralgon.

Queensland

- 4KW—H. B. Dearness, 18 Harrison St., Mackay.
 4KU—R. H. Gordon, Cr. Mark and Gleeson Sts., Hermit Park, Townsville.
 South Australia
 5FT—R. F. Farmer, C/o. Mr. C. W. Farmer, 7 Kirkcaldy Rd., Grange.
 5KS—R. A. Searns, 13 Wellington Rd., Payneham.
 5NC—R. G. Clayton, 27 Harrow Gr., Seacombe Gardens.
 5RK—D. S. Robertson, Station: Maromika, Mt. Lofty, Postal: C/o. Physics Dept., Box 4 Canberra, A.C.T.

Western Australia

- 6UT—F. H. Turner, 15 James St., East Cannington.
 6ZX—E. E. Grey, Commonwealth Bank of Aus., Leederville.
 Tasmania
 7CF—C. J. Frisby, Flinders St., Brooklyn Burnie.
 7RI—R. V. Bulman, 2 Bond St., Kings Meadows, Launceston.
 Territories
 9WI—J. Widdup, C/o. R.T.C., Sohans, Bougainville.
 9DS—D. H. Schroder, C/o. D.C.A., Madang.

CANCELLED CALL SIGNS

- VK— New South Wales
 2UL—J. R. Hamilton (Miss).
 2ADM—L. E. Radcliffe.
 2ATC—Sydney Technical College.
 Victoria
 3AWM—W. R. Moffatt, Now VK3PD.
 Queensland
 4ID—D. N. Bimble.
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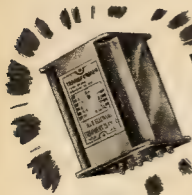
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FEDERAL, QSL, and DIVISIONAL NOTES

FEDERAL THE NEW YEAR

Once again the Federal Council and the Federal Executive of the Institute desire to wish all members a Happy and Prosperous New Year.

It is appropriate at this festive season to give new members thought to those whose work and efforts have kept our Institute functioning. Many play a part, and a special vote of thanks and good wishes for the future goes out to the Magazine Committee, Federal Contest Committee, QSL Managers, Correspondents, Traffic Officers and the others who behind the scenes, make the smooth running of the W.I.A. 1958 promises much in electronics with Television on the immediate horizon. However, with experience from the past to guide its decisions, the W.I.A. can look with confidence to the future.

FEDERAL STATION VK3WIA

Members will have noted that the Federal Station VK3WIA is being used at the Pan-Pacific Scout Jamboree at Clifford Park, near Melbourne.

It is intended by Federal Executive to have this station in operation during the coming year.

Regular broadcasts, disseminating news to all Divisions, are proposed. These will be given by members of Executive and will cover topics of a Federal character. In this way, all will be kept informed of the activities and prospects of Executive and its kindred bodies at first hand.

FED. CONTEST COMMITTEE

A letter was received concerning the issue of Certificates for Awards made to winners of past Contests from which it appears that many VK/ZL Certificates have not been sent. It was received by the Committee that as soon as time permits the omissions would be rectified.

To assist the Committee, it is asked of contestants who were due for Awards in ALL the Contests run by the W.I.A. in the year 1954, that they notify the Committee immediately. Box 1584K, G.P.O., Adelaide, together with the details of Contests Awards, etc.

The question of having a sub-committee conference at the Easter Convention, if one is to be held, was discussed at some length and following the action received from the divisions regarding the framing of rules for the various contests, it would seem that such a conference will be the only means of arriving at some unanimity.

The value of comments received, along with logs submitted by contestants regarding rules, conduct of the contest, etc., brought serious discussion and it was agreed that these comments should be the true guide to any alterations. It was felt that those who submitted logs were the interested parties. However, where there is a definite policy directive, the Committee has no option but to follow that policy until such time as the Council either repeats it or frames some other policy.

Photographs of the Ross Hull Memorial Trophy have been received by the chairman and the contest, etc., have been sent to the previous winners. A letter will be forwarded to each winner before his copy is sent. Those who receive these very fine prizes will certainly congratulate Federal Executive on their foresight when they agreed to a request from the Contest Committee for permission to have them done.

FEDERAL QSL BUREAU

RAY JONES, VK3RJ, MANAGER

Tom Laidler, VK3ZL, Postmaster at Alice Springs, N.T., advises that he will try and get on 2400 kHz. twice daily for the benefit of overseas stations desiring the contact with Northern Territory for the W.A.V.K.C.A. Tom will get on at 0900 and 2100 GMT. All contacts will receive a QSL via the Bureau.

VK3ZL will appear on 50 Mc. as soon as he can get on for that band. He is still in the building process.

Interesting cards sighted during November and December of 1957. Afghanistan: FV7KZ of Cayenne, French Guiana, and AC3YN, of Tibet. The latter card confirmed a QSO with Trev VK3ZL on 27th August 1957. Fakel Eriksson, SNA4WV/MMX above M.S. "Mangarilla" would appreciate a visit from

any local Amateurs while his ship is in various VK ports. He recently was at Melbourne, Adelaide, Port Pirie and Burnie. The ship runs between VK and the West Coast of U.S.A. Eriksson operates 14 Mc. c.w. during the voyages. His QSL shows a nice picture of the ship.

Mick Russell-Clarke (ex-VK4IC, of Willis Island, and now resident in VK3 land) advises that he hopes to have his QSLs ready for distribution in the near future. During his sojourn of 15 months in Willis Island, East of Cairns, Mick kept VK4IC on the air almost daily, using c.w. and phone.

Any VK who worked VP4AZ and did not obtain his QSL, card, can apply again to Mr. Faulkner, 13 Lovatt St., Newport, Pagnell, Bucks, England. VP4AZ operated from Graham Land, Antarctica.

FEDERAL AWARDS

W.A.V.K.C.A. AWARD

Additional Certificate, No. 19, has been issued to J. P. Grubbe, WRTY

OFFICIAL COUNTRIES LIST

Elsewhere in this Journal will be found the official countries list as at this date. The list is made up in alphabetical order of prefixes and zone numbers are also listed.

ADDITIONAL COUNTRY

Kermadec Island, a dependency of New Zealand, has been declared to be a new country, effective 1/1/58. It would appear that Laos, Cambodia and Viet Nam will be declared separate countries by the time this reaches the

—G. Weynton, VK3XU, Awards Manager.

VICTORIA

STATE CONVENTION

Those who attended the State Convention at Bendigo had a very enjoyable week-end, some renewing old acquaintances, others making acquaintances with fellow Amateurs who up till that time had only been voices. Approximately fifty-three attended the Convention; this was not as large a crowd as usual and was a little disappointing for the organisers. After the dinner and the departure of the ladies to the pictures, the OMs got down to the business of the Convention.

There were six items on the agenda and these were apparently very fully discussed as they were still discussing item number 30 p.m. when the ladies returned to rejoin their supper. After supper a film from the Monsanto Chemical Co. on their latest developments in the chemical field was shown. This film was very interesting, but it was also very late by the time everyone got to bed.

However, a State Convention only comes once a year. Those who slept at the hotel got a good night's rest, but those who camped at that very picturesque park, "White Hills," know exactly what sort of a noise a peacock makes all night long.

The first item on the programme on Sunday was a State Convention on Saturday. One of the competitors this provided a scenic tour of Bendigo over mine shafts and "molecular" escape as someone has inscribed and sent to those heaps of rubble to be seen everywhere around Bendigo. The tx was finally located by Laurie 3ALY at Lightning Hill, near Eaglehawk. Those who located the tx there were rewarded for their efforts by a wonderful panorama of the Bendigo district which could be viewed from a lookout at Lightning Hill.

Then followed another tx hunt, this time on 80 metres. This was a really difficult hunt. After traversing some bush tracks in heavily wooded country, the tx was located fairly by Don 3ALQ deep in the scrub in the vicinity of One Tree Hill, nearly an hour after the signal had come on the air. While these hunts were being run, a bush tour of Bendigo, as alternative entertainment, was enjoyed by others.

After lunch all gathered at the White Hills Gardens where there were events for all. Two frequency guessing competitions were won by Bill 3AMN and Associates and by Robertson, a net driving competition for ladies was the next on the programme and this was won by Mary 3MR, 3ALY, followed by a "stepping" or "cricket pitch" which was won by Alma (Mrs. 3AMN), and a treasure hunt for the children, won by the President 3TF's harmonic, John.

A grand week-end altogether, we thoroughly enjoyed every moment of it, our only regret

was that there were not more there to enjoy it with us and reward Neville 3ACN for his colossal job in organising the Convention, and Pat, his fiancée, who was a charming little hostess to the ladies.

GENERAL ITEMS

The A.O.C.P. Cram got away to a good start with twenty-two pupils attending on the first night, however there are still a few vacancies for anyone desiring to do the course. Yours truly joined in the struggle once again, pretty tough on poor old "teach" though, he has to leave out most of his appropriate little stories with a female in the class.

The best item of news for the month was the announcement of the engagement of life member and councillor, Jack Duncan, SVZ, to Misseryl Munroe. They plan to marry early in the New Year. Congratulations and best wishes are extended to you both, Jack and Phyl. (Looks as though this Fox has been running with the hounds.—Ed.)

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Calling CQ at State Convention (Bendigo). Left to right: SAGJ, SAKW, SAGN, SZS, SAWC, SATK.

For the holiday week-end at the end of January, a group of Amateurs and their families are going to Portarlington to enjoy camping, Amateur Radio, the seaside and perhaps a little fishing. If you are interested in these things, come along and join us. For further particulars get in touch with Mrs. JLN (PU 6339).

The Institute activities wound up for 1955 with a family night in a real Xmas spirit. This was in place of the general meeting and OMs, XYLs and harmonics enjoyed a very excellent selection of films. The children all received a Xmas novelty and supper was enjoyed by all. The President, Gordon STY, extended to members and their families, Xmas

greetings and best wishes for the coming New Year.

AMATEUR RADIO CONVENTION

The activities this month have been very numerous with the Convention held in Colac on 12th and 13th November. Several chaps worked mobile coming down, but conditions did not favour 40 or 80 mcs. 14 Mc was extra good as Tony SZAZ and his XYL were transmitting whilst mobile to SAGV in Colac, although Pauline had to do all the driving.

On arrival we were greeted at SAGV's QTH and received hotel bookings for the evenings, or should I say mornings' sleep, as that is how it usually turns out, as John SAGD and Kevin SAKR will agree.

Those present at the dinner were as follows: Bob ZIC, Harry SZL, Tony SZAZ and XYL Pauline, John SAGD, Gordon SAGV, Brian ZEB, Mari SAKU, Ed SAKR, Bill SAWZ, Ron STX, Dud ZAKI, SAKU, Leigh III, Reg SATP, Bill Wines and Jack SAMP. We were very fortunate in having as our guest WIDKC, Earl Whiddon, from Boston, Mass., U.S.A.

The Convention was officially opened at the dinner by His Worship the Mayor of Colac, Cr. D. Stalker, 3EL. We trust that this event may tend to increase public interest in the affairs of Amateur Radio.

The M.C. at the dinner was Chris SAKU who has not been in the zone a great time, but did an excellent job along with Gordon SAGV who had all the responsibilities.

After the dinner, Chris SAKU brought the tape recorder with him and we heard a very good lecture by Dr. Grote Reber on Radio Astronomy, which was most interesting. Following this we had another lecture on the tape, this was on Atomic Energy by Professor Baxter, which also was most interesting.

After the conclusion of these lectures, Bill had his projector and he presented a few films including the beautiful coronation film. Leigh, you had better bring it to the Werrnsnool Convention in March.

Supper was served later in the evening in the hotel dining room. After supper, we migrated to our rooms for some shut eye, but room 13 did not go QRT until about 2.30 a.m. SZAZ started to re-build a modulator of a Type 3 while awaiting the late arrival of Kevin SAKR, who was working mobile on his way down from Westmead. He arrived at 12.45 a.m. and took over the modulator building.

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JSM, who was at Alexandra a while back, spent a recent holiday at Springhurst. Vern SAXW is quite active. Norm McDougall is now receiving "A.E." Jack Dunne has applied for Associate membership, and ... Laughlin is making enquiries about O.C.P. questionnaires. Ray AGI and Alan JUI are very interested in the v.h.f. field days. It is understood that Keith S.H. will be with them, if the house-building permits. Peter 3AFF is active on 8 m. Johnny 3ACK is active on 40 and 20 m.

Well, there you have it for this month. Don't forget the first general meeting for 1956 will be at the usual place on the fourth Friday of January. Let's see a good roll up to start the year on the right footing. All the best to you all from 4ZM and 4PR.

The Chairman then called upon Cliff SCK to propose a vote of thanks to the lecturer, pointing out to members that Cliff had had considerable experience in the field whilst stationed at the McLaren Vale Exchange.

Business matters were at an all-time low and after correspondence had been received and new members accepted, the meeting was closed at 215 hours, and the unofficial meeting began with the members' social. Ladies got in for DXD exploits. As the official QSL Officer, George SRX, was unable to attend owing to audit work, Douglas SDY and Joe MO handled the distri-

bution of the cards. The new members were: Messrs. V. L. Schwingner (country associate), L. K. K. (S.M.), and J. S. (S.M.). J. Stewart (EZAS), full country member. Welcome back into the fold again Bill SDR, who has been inactive for a while. Another old-timer, George SGB, is with us again.

Round the city there is a revival of DX chasing with Reg SQR pacing along with Jim FJO and new comers. Even my car and I will work on 14 Mc. and my notes include John HUI and Dougal SBY who are always there when you need a signal. The only way to get SDR round the world from that new QTH of yours: don't plan too late, or the sunspot cycle will not let you. Another old-timer, Bert SQR has been heard calling the rare ones too. I'll bet you find your new location somewhat of a paradise after your trials and tribulations elsewhere. Heard the H.C. accompany the signals. What is his cubical quad? Did the big blow remove it? What about the gen on it for the magazine?

Now when I get around to working rare ones—guess who—Luke SJA, was very glad to know that the tranny was successful. Luke. Shall be glad to have you in the "Tons" team on the Picnic Day. We might even talk Pansy into joining us again, but Doc, you can't qualify for the phone this time, after c.w. on the 14 Mc. "Hardy, sir, hardly! It wouldn't be cricket, sir." What makes me wonder if it ever was, or is, or ever shall.

Ron SMC has been somewhat seedy, but we hope that life is picking up again in time for the Ross Hull contest. Albert SJA is now in a Boys' Club at Brooklyn Park and with Howard SJA and Joe SJO, at the Brompton Boys' Club, stayed in the dormitories. Many others assisted from outside with signals and it stimulated the interest of the lads and their parents. These are very valuable works that some of our members are doing, and they are bringing credit to the Institute with their efforts. We also have Les SAK interested in the contest. Get the 14 Mc. team together, too, who are showing a lead to the young folk and do it whenever they can.

Have had some serious contacts with the country on Sunday mornings, but conditions are still poor for Fred BMA at Benmark. Conditions can be excellent at all other times. I have had a few contacts with Fred, possibly because the shadow of the hills. Fred. Even had a contact with Les SUX at Cork, with the same shadow. The shadow of the hills has been fair on occasions also. Reports coming in indicate that 40 mx transmissions from BRR often get through when the signal is not so good. I have been using a 6 mx link from SWI and find that he can modulate the 80 mx to much better.

Rec'd a copy of the running schedules to the Eastern State on 20 mx and Howard SJA and Joe NJO have had success with Tom TSL, located in the U.S. I have had a few contacts with him of closing down like a trunk line call and leaves each end suspended like a fish out of water—that's the way it happened on recent Sunday morning with me waiting to have a work with Tom, but he sent us a batch of hot weather as a reminder!

Stuart SDR has been very kind to know that Bram EZAB (get it right this time Ed.) had passed his code exam and hoped to be busy on the 14 Mc. team. I have had a few contacts with an associate no longer—congratulations to you both on your perseverance. Stuart has resurrector 11 Mc. and has been very successful. I have had his other one for him, but finds it works better off the back; what are you grizzling about, it works doesn't it? The R.D. Trophy should have been awarded to him. I have had a few contacts with Bruce BOR has written a small card to display with it.

ETRE'S PENINSULAR

Wally SDF reports that Pat SLE is once again active on 20 mx, having re-built tower and base. This time located well away from any other ham. He is now working on 14 Mc. The beam is a "ZL Special" with SLE modifications. Reports show that it works from the back as well as from the front. However, the beam is still a little beam. Jack SVD these days, but he is still in Pt. Lincoln. Lack of signals rather suggests that business keeps him away from the radio. I have had a few contacts with his v.h.f. ambitions and Xmas 1955 is very keen. Associate Alf is studying for the A.O.C.F. and has a good chance of winning it. He is doing quite a bit of listening—c.w. no doubt.

SDF usually around for a contact with SWI on Sundays. However 90 cycles is bread and butter for Wally and family. He is now working for the rest of the week. Some 50 miles S.E. from Lincoln is an island called Wedge and on it is a Ham called Norm. Norm is a very good YFM. The Norm works with XYL and family and naturally enough Norm looks for contacts on 7 Mc. phone and c.w. in such a lonely

outpost. Recently wife and three children have come into Lincoln so the kids and wife have heard SDR. SDR is now working and has for company some 1200 sheep, a few cows and some 50 wild goats! No sheep, keep a look out for that. SDR is now working on 14 Mc. with a portable station by Wally was only successful from the "fish-feeding angle" as the tx refused to work.

Bert SDR has decided that Cape Borda Light-house is a good place to spite of lightning strikes and other inconveniences. Bert says he hopes you can hear him, but he is mixed blessing. Bert! You still have to hear them to work them. Hope that the 144 Mc. rig is coming in a few days. Bert, but steadily, for the Ross Hull Contest.

LOWER NORTH

Ern SEN still has time to be active; glad you have seen the note. DX before Diablen. Main thing is to keep it hidden from the XYL. Very nice score you put up for the R.D. Contest, it should be possible to display the Trophy there later on after it has been across to Lincoln and if you can arrange same. SJA also active and heard here on 40 mx. Had a brief but pleasant contact with Brian SGO a Sunday or so ago. John SVO at Laura manages to pop up occasionally. Compton SEF at Gawler usually listening on 40 mx or 14 mx relay from South Australia. Both are working on beams, remote controls and other technically intricate schemes. What about drawing that amazing diplexer for "A.R.T."

SOUTH EAST

Stuart reports that the monthly meeting was sparsely attended, but the meeting was interesting. He said that those who visited the new A.B.C. station, SMIG. This station is fully automatic and seems to do about everything but find its own way. The A.B.C. does even that, doesn't it Warwick?

Erg SKU was absent from the meeting; has been for the last few weeks. Claude SCA been in hospital having an operation. Hope you both are well when you read this. Les EZAG also trying to contact you on 14 Mc. v.h.f. but to state not much success. Stuart finished his 31 Mc. converter and trying it out on the aforementioned beam. He says he has done the work on the occasion; don't tell me you've taken up teaching Stuart! No, oh well, I thought I might be able to do a swap. I have had a few contacts with him. English these days; where have you been boy? And now from the President and Council, all the best for the future. I have had a few contacts with better beams, converters and DX. 1955 has been a good year for this Division, let us make 1956 a record for membership and success. I have had a few contacts with "Amateur Radio." Since thanks to those sub-editors in our country centres who have faithfully sent in notes.

WESTERN AUSTRALIA

The usual monthly meeting was held in the Technical College Annex during November. Business was brisk. A letter from the Divisional Secretary (Jack Mead) was read giving notice that he intended to resign as he expected to go on an overseas tour. The Divisional Secretary for the Divisional typewriter please contact Jack. Signals were presented from VKT (re broken down), and from the Divisional Secretary (P.E. re the granting of Amateur Television licenses).

The Divisional officer reported that the closing date for lodging of logs for the Week-end Mail Contest had been extended. Results of this contest have since come to hand, and first place was taken by SWI with 120 contacts, and then 122 countries during the month of the contest. Runner-up was Jack SEI, who worked 85 countries. MJO and Jack JAC were third.

After the closing of the meeting, members adjourned to see some films presented by Mr. M. Crabbe, publicity officer of our country. The films completed. These show various aspects of oil search, both on land, in many different parts of the world, and on the sea floor. The final film was a cartoon showing the working of the technical side of oil search—rock formations likely to bear oil and testing methods, etc. The unit was presented by Mr. Crabbe for an extremely interesting meeting.

Skinner SWS has had a birthday recently, his 34th. Believe me, he is still ailing. ZL-22-22-22. Congratulations! Skiver and more of them! Jack SEI tells me that during the course of his DX working, he has been experiencing a few problems. He is now working in VKP and G land with I wait input. A new full license has appeared on 40-Jim KTK, at Geraldton. He is working on 14 Mc. on Sunday afternoon appearances. Glad to hear you around, Jim. Another new license (limited) is Tom, of Brunswick. Tom is a stayer,

he posted at his sixth attempt. Congratulations QSL. Tom is having a go at the more next time and expects to pass.

Your scribe and Wally EZAA recently visited Albany with the expressed intention of collecting all the QSLs in the collection of Albany Amateurs were present in SGO's shack: LEL, SKI, SMC, and SMC (complete with tape recorder). Harry SJA still house hunting—so far without success.

Bernie's (SKZ) garden looks quite impressive with three four-section SJKs and an 80 mX dipole.

The 40 mX Scramble was fairly successful, apparently. A post mortem set the number of participants at 28. Results are still being awaited.—ERE.

TASMANIA

Well, chap, another Christmas has passed, and that it was not a very happy one for all concerned. The time lag between writing and printing caught me out, and, too late I realised my omission to extend greetings. However, as I write these notes, in November, I can avoid a repetition, and I take the opportunity now of extending to you, one and all, the best wishes for the New Year. I hope 1956 bring you all that you would wish yourselves.

The 40 mX field day, held on 20th Nov. proved a most successful event, with the honours going to Dave TDH. The tx was hidden at Blackmans Bay, and quite a number of reports, although a certain select band (all with the same excuse) arrived a little later on. Mottum. That old reflective mood. The Perpetual motion machine was working on 14 Mc. and TFL, and doubtless it will take pride of place in his lounge room.

New Investigation Service is still active and recently Len SLE and Harry Melling, of the Wireless Branch, visited TRK in another attempt to locate the interference. You have guessed it, the noise was conspicuous by its absence. Better luck next time chap.

By now, TFL will have moved to his new QTH at Wynyard since his last visit. You are last thing to be packed prior to moving, there is a fair chance that it was one of the first ones to be packed at Wynyard. Hope it moved smoothly. Len, Leon TFL is now at Queenstown. Let's hear from you Leon. Harry THB has just had a most unfortunate accident. He was on his way to work, and he was hurt. express a most fervent hope Harry that when this appears in print you will read it with the same interest and enthusiasm.

News of Doug TDZ reveals that he has visited Italy, Spain, and Germany, and is now in London. Doug hopes to visit Australia before returning home. Doug is most impressed with the hospitality extended everywhere he has been. Max TCA has found that upward modulation of the signal is a most costly business. Better fit a de-compressor on that accelerator. Max, Tom TSW also recently had an interesting contact with TFC active on 40 mX. In the early hours of the morning, and evasive action was taken, but they established contact. It would appear, fortunately, that they are not interested in QSLs.

If you know of a QTH which is t.v.t. and b.c.t. proof, and gives guaranteed DX with an antenna on 14 Mc. please write to contact TFL. Heard Island and offers over five figures will not be considered, and the house should be suitable for a most costly business. Perpetual Trophy. To sum up, Ted has sold his present QTH and is looking for another one. TFL advises that he has a following of people who would like to see a contact with TFL. Heard Island and offers over five figures will not be considered, and the house should be suitable for a most costly business. Perpetual Trophy. To sum up, Ted has sold his present QTH and is looking for another one. TFL advises that he has a following of people who would like to see a contact with TFL. Heard Island and offers over five figures will not be considered, and the house should be suitable for a most costly business. Perpetual Trophy. To sum up, Ted has sold his present QTH and is looking for another one. 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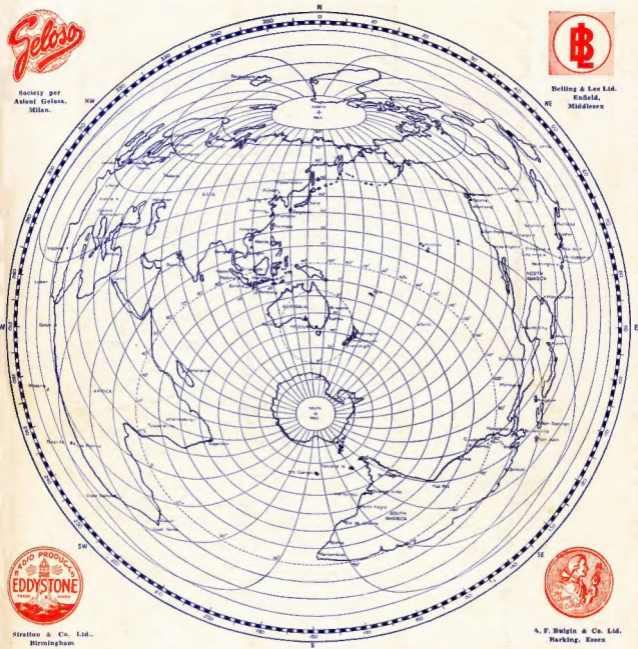
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